



## Chapter 5: Program & Policy Recommendations

### 5.1 Introduction

Creation of a successful Bicycle, Pedestrian, and Greenway Network will involve more than facility improvements. The long-term success of the network will also depend on use and support of the bicycle, pedestrian, and greenway facilities. It will be critical for the City of Greensboro, the surrounding communities, and the State to educate pedestrians, bicyclists, and motorists about safe behaviors in a multimodal roadway environment, to enforce laws that make pedestrian and bicycle travel safer, and to encourage people of all ages and abilities to use the bicycle, pedestrian, and greenway facilities for the promotion of health and wellness. In addition, facility maintenance and long-term facility planning must be built into existing practices and policies. The subsections below detail several critical program and policy areas addressed in this chapter:

- An overview of the “Four E’s” of pedestrian and bicycle planning has been adapted for the purpose of this Plan to provide recommendations for education, encouragement, enforcement, and engineering programs to include greenways. Engineering design is discussed in Chapter 4 and Appendix C - Design Guidelines.
- An overview of the opportunities for programs to generate revenue.
- Specific policy recommendations and comments outline potential modifications to both the Guilford County Development Ordinance and the City of Greensboro Unified Development Ordinance. These modifications are to be shared with Pleasant Garden, Oak Ridge, Sedalia, Stokesdale, and Summerfield for incorporation into their respective development ordinances.

- A review of bicycle and pedestrian efforts by the North Carolina Department of Transportation (NCDOT) takes a look at current initiatives and policy resources at the state level.

- Recommendations for coordinated action among the Greensboro Transit Authority (GTA) and Greensboro Department of Transportation (GDOT) highlight areas for bicycle and pedestrian program and policy improvements.

- Finally, a list of recommendations for potential supporting facilities provides ideas that can be used by multiple agencies and organizations.

### 5.2 Education, Enforcement, and Encouragement Programs

Once safe facilities are in place, continued support for and use of greenway, pedestrian, and bicycle networks are increased through programs that focus on Education, Enforcement, and Encouragement. These categories are the foundation used in evaluating applications for the national Bicycle Friendly Communities (BFC) Program. In North Carolina, Carrboro and Cary have both been designated as “Bronze level” BFCs. If Greensboro wants to become a great place for bicycling and walking, it should strive to implement programs that other BFCs have completed. The key to success is not just to provide these kinds of programs but to provide them in a scale and quantity that reaches the community population.

These programs enhance the overall health and wellness of the community by promoting, teaching, and enforcing safety. Education, encouragement, and enforcement programs increase user safety, build excitement, and encourage additional area



citizens to become pedestrians and bicyclists. Active programming can increase the number of pedestrians and bicyclists, thus increasing overall physical activity. Whether it is an event for children or a distribution of bicycle route maps, these types of programs spread information and promote all of the positive aspects of bicycling or walking in the Greensboro Urban Area.

Currently Greensboro has numerous organizations and events that support physically active programs. Safe Guilford, an injury prevention coalition, addresses bicycle and pedestrian safety and sponsors local events such as bike rodeos, bike safety exhibits, and helmet fitting sessions. Bicycling in Greensboro (BIG) is an organization that formed during the preparation of this Plan with many founding members participating in public workshops. It exists to help bicyclists discuss issues and to distribute information relating to bicycling. Events such as National Trails Day, bike rodeos, and Bike to Work Days are already successful in Greensboro. Police Bike Patrols currently provide a level of enforcement and education in the Greensboro Urban Area as well. Finally, Greensboro has been designated a “Fit Community” by Fit Together. This designation recognizes Greensboro as one of the first communities to excel in healthy lifestyle promotion across the State. The recommendations from this Plan help to further that status.

The following sections describe national and local opportunities for education, enforcement, and encouragement programs along with other initiatives in Greensboro. Existing programs are also discussed with additional recommendations. In general, all existing programs should be enhanced with an increased effort to reach all ages and portions of the area’s population. This can be done by geographic program distribution and different methods of communication and reaching out to the community through television (Local Channel 13), newsprint (Greensboro News & Record

and Rhinoceros Times), Internet, community groups, local advocacy groups, schools, etc. All programs, broken out by category below, are important and should be developed when possible in the Greensboro Urban Area. They each offer a unique tool, many successfully used in Greensboro already and across the country. The individual programs should be developed, enhanced, and/or promoted more widely by cooperation between the State, local government (Greensboro MPO, Greensboro Parks and Recreation, etc), advocacy groups and non-profits (BIG, Safe Guilford, Friends of Parks, etc.), schools, community organizations and other local supporters, donors, and volunteers.

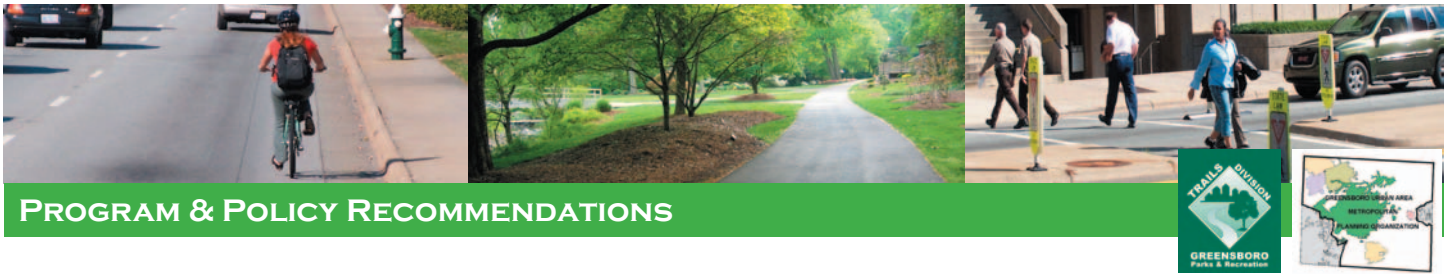
### **5.2.1 Education**

Education is key for all pedestrians, bicyclists, and motorists to improve proper use of facilities in Greensboro. A number of resources exist to disseminate education and are recommended below including safety materials and devices, campaigns, training, and events. There should be an effort to continue and expand the City’s partnerships with health-related organizations to encourage public education regarding bicycle and pedestrian safety.

#### ***Campaigns and Materials***

##### Safety Materials and Devices

Currently, GDOT has a variety of existing safety programs where literature and safety devices, such as retro reflective arm bands and cuffs and flashing lights for low light conditions, are distributed. Additionally, GDOT has implemented a program of pedestrian and bicyclist safety education through participation in community events, as well as talking with groups about safety. Events, such as street fairs and school safety days, have been used to attract media attention, in attempts to reach a wider audience of people. Information is periodically distributed to media outlets



about safety and workability initiatives.

The Greensboro MPO should build on these existing programs by continuing to develop a variety of safety materials and distribute them widely throughout the community. These materials can focus on safe behaviors, rules, and responsibilities. Information may include important pedestrian and bicycle laws, 5 to 10 keys to safe pedestrian and bicycle travel, safe motor vehicle operation around pedestrians and bicyclists, and general facility rules and regulations. This safety information can be distributed through brochures, newsletters, newspapers, and other print media that can be inserted into routine mailings. It can also be posted on municipal websites and shown on local cable access television (Channel 13). The City has distributed information periodically to media outlets about safety and produced a show on City Cable Channel 13 about workability initiatives.

Several examples of safety materials have already been developed. The North Carolina Driver's Handbook has an entire section devoted to bicycles, bicyclists' rights and responsibilities, and how motorists should behave. Programs to promote bicycle and pedestrian safety should be included in high school driver education classes.

[http://www.ncdot.org/transit/bicycle/safety/programs\\_initiatives/share.html](http://www.ncdot.org/transit/bicycle/safety/programs_initiatives/share.html).

The Town of Cary, NC has produced a digital bicycling video that can be used as a model.

<http://www.townofcary.org/depts/dsdept/P&Z/bicycleplan/bicycleplanoverview.htm>.

The StreetSmart public awareness campaign in the Washington, DC region is another example of a PSA educating residents about pedestrian and bicycle safety.

The Greensboro MPO should also build on programs that distribute safety devices throughout the community. In addition to the programs already listed, Safe Guilford is also involved in the distribution of safety materials and devices through the Helmet Promotion Program. This program is funded by NCDOT's federal safety funds, which were used to purchase bicycle helmets for distribution at local bicycle safety events in communities across the state.

[http://www.ncdot.org/transit/bicycle/safety/programs\\_initiatives/helmets\\_promotions.html](http://www.ncdot.org/transit/bicycle/safety/programs_initiatives/helmets_promotions.html)

#### Share the Road Initiative

The State Division of Bicycle and Pedestrian Transportation has been a leader in educating both cyclists and motorists about their rights and responsibilities in sharing roadway space. In 1982, the Division undertook its first statewide safety campaign on the theme, Bicycles Are Vehicles. The thrust of this campaign was to increase awareness among motorists that bicycles have an equal right to use the state's highways while educating bicyclists of the need to ride responsibly as vehicle operators. To alert motorists to the presence of bicyclists in certain heavy traffic areas, the Division worked with others within the NCDOT to create a "Share the Road" sign, a yellow/green diamond warning sign with a bicycle schematic and a plaque below with the words "Share the Road." These signs were first produced and erected along roadways in 1987. The sign was later adopted as part of the Manual on Uniform Traffic Control Devices (MUTCD) that is used throughout the country. The City of Greensboro should increase the usage of these signs, in accordance with MUTCD standards, particularly on low volume rural roadways that become bike routes before they receive new shoulders (See discussion in Chapter 4, Bicycle Facilities).





## ***Training***

### **Internal Planning & Design Training**

Agency staff and members of local planning and review boards should participate in annual training sessions on integrating bicycling and walking into all projects. Internal training will be essential to institutionalizing pedestrian and bicycle issues into the everyday operations of the transportation, planning, and recreation departments in Greensboro. This training should cover all aspects of the transportation and development process, including planning, design, development review, construction, and maintenance. This type of ‘inreach’ can be in the form of brown bag lunches, professional certification programs and special sessions or conferences. Pedestrian and bicycle planning and design issues are complex, and national research and guidelines continue to evolve. Therefore, training sessions need to be updated and repeated on a regular basis.

### **League Cycling Instructors (LCI) Training / Bike Education**

The League of American Bicyclists has a national Bicyclist Education (Bike ED) program that includes certified LCIs who can offer local bicycle skills training courses. The Greensboro MPO and the local bicycle advocacy community, including Bicycling in Greensboro (BIG) should provide information about LCI training and the Bike ED program.

### **North Carolina School Crossing Guard Training Program**

As traffic continues to increase on North Carolina’s streets and highways, concern has grown over the safety of our children as they walk to and from school. At the same time, health agencies, alarmed at the increase in obesity and inactivity among children, are encouraging parents and communities to get their children walking and biking to school. In response,

the Division of Bicycle and Pedestrian Transportation funded a study on pedestrian issues, including school zone safety, and decided to establish a consistent training program for law enforcement officers responsible for school crossing guards. According to the office of the North Carolina Attorney General, school crossing guards may be considered traffic control officers when proper training is provided as specified in GS 20-114.1.

[http://www.ncdot.org/transit/bicycle/safety/programs\\_initiatives/crossing.html](http://www.ncdot.org/transit/bicycle/safety/programs_initiatives/crossing.html)

## ***Events***

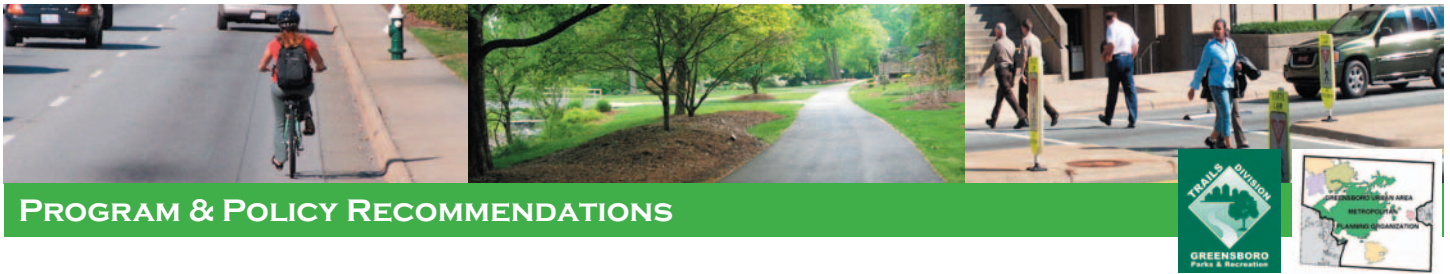
### **Bike Rodeos / Safety Town**

The City of Greensboro and surrounding communities should continue to work with local bicycle and pedestrian advocacy groups and law enforcement agencies to provide pedestrian and bicycle safety training to children in the Greensboro Metropolitan Area. Bicycling and walking rodeos, such as the Guilford County Bicycle Rodeo, training sessions at the local “Safety Town” site, and other educational activities should be promoted so that safety skills can be taught on an ongoing basis.

## ***Teaching***

### **Basics of Bicycling Curriculum (NCDOT)**

This elementary school-level course was developed in 1990 by the North Carolina Department of Transportation Division of Bicycle and Pedestrian Transportation and the Bicycle Federation of America (now the National Center for Bicycling and Walking). More than half of the 120 school systems across North Carolina have used the program, which currently reaches approximately 60,000 fourth and fifth graders annually. This complete curriculum package includes a clearly written and easy-to-use Instructor’s Guide. A video provides an overview and tips on teaching the



program as well as two instructional modules for the students. The Guide offers step-by-step instructions so that interested adults of differing cycling abilities can teach the course, using outside resources where necessary to augment their own skills.

<http://www.ncdot.org/transit/bicycle/safety/programs/initiatives/curriculum.html>

#### Bike Repair Video (NCDOT)

Having a bicycle in good repair is an important part of bike safety. Yet every year, a large percentage of bike crashes are caused by mechanical problems and poor maintenance. For this reason, the NCDOT funded the production of a bicycle repair video in collaboration with the North Carolina 4-H program. The video, which can function as a stand-alone education tool, coordinates with the 4-H Cooperative Curriculum entitled Bicycle Adventures for children aged 11 to 15.

<http://www.ncdot.org/transit/bicycle/safety/programs/initiatives/video.html>

#### Interactive Tours

An educational component to the greenway, pedestrian, and bike network could be added by developing historical, cultural, and environmental themes for the facilities. The Jesse Wharton Interpretive Trail and the Guilford County National Military Park Trail are great examples and already exist in Greensboro. This idea can be adapted to create walking or biking tours throughout the City, using signage, to identify the events, architecture, and habitats that make the City of Greensboro unique. These tours should be simple to navigate and should stand alone as an amenity. However, brochures can be used to supplement signage with more detailed information and a map of the tour. Other ideas to supplement the signage could be organized “talks” or lectures by local experts, similar to the environmental education walks the Lake Wardens give for area children in the watershed region.

#### Outdoor Classrooms

Greenways, parks, and open space should be utilized as outdoor classrooms to teach environmental issues and cultural history. Local schools, youth groups, and clubs could benefit from outdoor educational opportunities, such as nature hikes, edible landscapes, community gardens, etc. Outdoor classrooms also facilitate walking/hiking and facility use. In addition to learning about the selected topic, a respect for the environment and a healthy lifestyle would be taught as well.

Currently, the Lakes Division of the Park and Recreation Department conducts nature walks/hikes and maintains the signage along the interpretive trails. To expand on this program, local volunteers, in addition to the existing Park and Recreation staff, could be used to share their knowledge about a particular topic in an outdoor classroom environment.

### **5.2.2 Enforcement**

A number of enforcement improvements are recommended below to help Greensboro improve safety for bicyclists and pedestrians. In order for proper enforcement to take place, officers should be trained and educated in bicycle and pedestrian laws. Carrying a copy of the NCDOT’s “A Guide to Bicycle and Pedestrian Laws” is a start.

#### Targeted Enforcement

Based on crash data analysis and observed patterns of behavior, law enforcement can use targeted enforcement to focus on key issues such as motorists speeding, not yielding to pedestrians in crosswalks, parking on sidewalks and in bike lanes, and failing to pass cyclists safely. Unsafe pedestrian and bicycle behaviors can also be targeted. An effective strategy is to conduct targeted enforcement in areas with high numbers of reported pedestrian and bicycle crashes as shown in Chapter 3, Maps 3.1 and 3.2. Greensboro’s



public input surveys should also be used to understand the concerns of area residents. The goal is for pedestrians, bicyclists, and motorists to recognize and respect the others rights on the roadway.

#### Crime Prevention through Environmental Design (CPTED)

This program is a necessary up-front action to assure that greenway, bicycle, and pedestrian facilities do not deteriorate due to crime or from fear of criminal activity. In pursuit of security and crime prevention, wise design and review of design by professionals, agency managers, field staff and safety and security personnel, CPTED stresses the importance of expanded implementation. It supports these techniques in cooperation with City police and other agencies, which is vital to the long-term success and enjoyment of the network facilities proposed in this plan.

#### Police on Bikes

Greensboro already has 30 trained city officers and one deputy serving as Police Bike Patrols in the Downtown area (Center City Resource Team). Also, 4 EMT's (Emergency Medical Technicians) work on bicycles. Increased use of police on bikes is a significant benefit for community policing and quality of life. This idea should be coordinated with and extended to include enforcement within the college campuses.

There are many advantages to having officers on bicycles in addition to patrol cars. One advantage is a different mobility and silent approach when accessing sidewalks, alleyways, parking lots, parks, and crowds. Costs for bicycles are less than for automobiles and gasoline. They provide community-based policing by having increased contact with citizens. They are ideal for enforcing traffic laws for bicyclists and can conduct educational intervention. They also visibly advertise bicycles as acceptable and ideal urban vehicles. The most proper areas for bicycle patrols are

Downtown, heavily-used greenways and parks, college campuses, higher density housing areas, and areas common to pedestrians and bicyclists. Greensboro should consider covering all of these areas with bicycle patrols.



Figure 5(a). Police on bikes are an excellent way to teach and enforce rules of the road.  
(Picture from pedbikeimages.org)

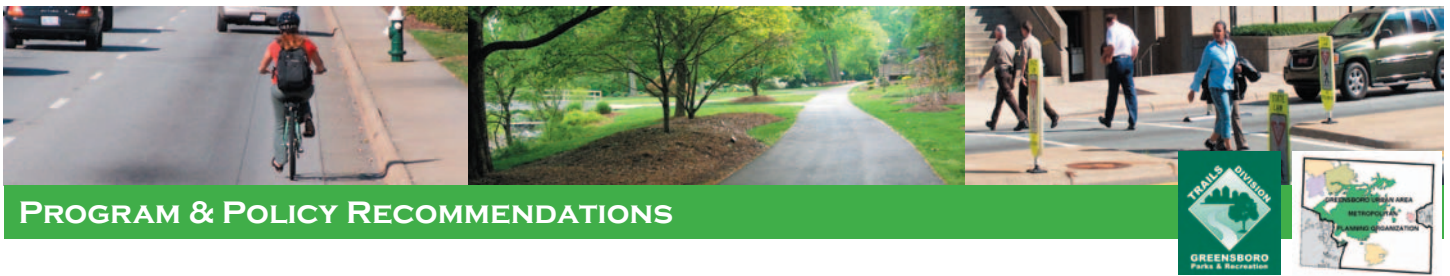
#### Trail Patrol

To maintain proper use of Greensboro's trail facilities, volunteers could be used to patrol the trails, particularly on the most popular trails and on days of heavy use. The volunteer patrol can report any suspicious or unlawful activity, as well as answer any questions trail users may have.

#### Enforcement Hotline

When users of the greenway, bike, and pedestrian networks witness unlawful activities, they should have a simple way of reporting issues to the police. A hotline should be created, which would compliment the Police on Bikes and Trail Patrol Programs, for people to call in and talk to a live operator or to leave a voice mail message about the activity they witnessed. Accidents can also be reported to this hotline. Accident locations can then be mapped to prioritize and support necessary facility improvements.





### Traffic Laws and Ordinances

Updating bicycle and pedestrian traffic laws is a significant step in developing a sufficient enforcement program. Successful ordinances give specific guidelines to be followed by each type of traveler, including bicyclists, pedestrians, and motorists. New traffic laws should be in agreement with current North Carolina state traffic laws and should clarify the means by which the roadway will be shared by all users. The resulting policies should be purposefully enforced.

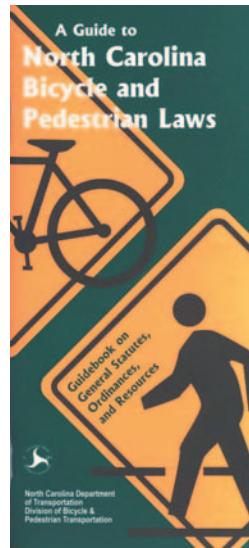


Figure 5(b). Local police should carry a copy of this publication, *A Guide to North Carolina Bicycle and Pedestrian Laws*, to help interpret the law correctly.

### Accident Reporting

Greensboro local law enforcement should be trained in accurate reporting of bicycle and pedestrian crashes involving automobiles. In many communities, police do not always adequately understand the rights of pedestrians and bicyclists. Proper interpretation of individual circumstances and events is critical for proper enforcement and respect between motorists, pedestrians, and bicyclists. Special training sessions should be instituted and occur annually for new employees within the Greensboro Police Department that focus on laws relating to bike and pedestrian travel. GDOT has conducted accident analysis and crash typing on pedestrian and bicycle accidents since 1998 and should continue to do so. Coordination between GDOT and the police department is necessary to communicate accident-tracking information and maintain an up to date analysis of bicycle and pedestrian safety.

## **5.2.3 Encouragement**

A large number of encouragement programs are available to the Greensboro Urban Area. Currently, many of these programs are in place, with the opportunity to expand on these further and institute additional encouragement opportunities. Programs can include events, program and facility advancements, and incentives. All of these events should be promoted with a wide range of media such as television (Local Channel 13), newspaper, website, local organizations and neighborhood associations, and schools.



Figure 5(c). Picture above from National Trails Day 2005 at Bur Mil Park. The Parks and Recreation Department Trails Division sponsors hiking events, information and map distribution, and a variety of games, music, and contests to provide education and encouragement.

## **Events**

### Awareness Days

A specific day of the year can be devoted to a theme to raise awareness and celebrate issues relating to that theme. Greensboro already has a National Trails Day, which occurs every July, where events, such as an organized run, campfire cook-off, and nature walks take place and exhibits are on display. Other annual events should be recognized and publicized in the



Greensboro community. Advertising the idea to the greater Greensboro area, and combining the event with promotions, contests, and educational programs, will help to make the event a success.

#### National Bike Month Promotion

The League of American Bicyclists annually proclaims May as National Bike month. Events can include proclamations, marketing campaigns, commuter contests and worksite events. Lists of national events during National Bike Month can be found on the Bike League website listed below. Events could be sponsored and run by Bicycling in Greensboro (BIG). Currently, PedPower, a program of the Piedmont Triad Council of Governments, sponsors Bike to Work Week and Bike to Work Day to celebrate National Bike Month. More information can be found at:

<http://bikeleague.org/programs/bikemonth/events.php>  
<http://www.pedpower.org/>  
<http://www.cyclesdeoro.com/BIG.htm>

#### Bicycle and Walk to Work Day/International Car Free Day

Designating one day a year for people to bicycle and walk to work can help advance TDM (Transportation Demand Management) programs, promote active living and raise awareness for environmental issues. A community leaders' commute ride, bicyclist breakfasts, public service announcements and other events can take place on Bicycle and Walk to Work Day. Bicycle and Walk to Work Day can be at the end of an entire week or month of pedestrian and bicycle promotional activities, including fitness expos, walking and jogging group activities, running and bicycling races and rides, etc. As mentioned above, PedPower sponsors Bike to Work Days in May with fueling stations around the Triad and Greensboro areas. PedPower works cooperatively with local jurisdictions to provide technical assistance, share information, identify opportunities, and promote events.

#### Annual / Regular Commuter Events

A commuter contest can have people bicycling, walking, using transit and driving over a 2 mile trip to see who gets there first or a cycling 'treasure hunt' could be held to demonstrate all the destinations people can get to by bike. As an example, in Durham, NC the last Friday of every month is currently the day for the Durham Bicyclist Breakfast at various downtown locations.

#### Alternative Uses for Facilities

Another way to promote network usage is to promote alternative uses for facilities. An extreme sporting event could become an annual attraction for Greensboro. The "Zone" Free Ride Bike Course Trail in Country Park would provide a great environment for a BMX event. Equestrian events could also be coordinated in the northern sections of the City, where the equine population and interest in the sport are very high. Both of these sports could include educational exhibits and information to promote safety and encourage proper use of network facilities.

Skateboarding or rollerblading could be included as a use on specific trails for a specified day every month during the summer, to encourage activity. If an activity is allowed with set rules and regulations and at a set time, destruction or abuse of facilities for unintended uses would be reduced.

#### Bicycling and Walking for Health Events

Throughout the United States, there has been an increasing awareness of the need to incorporate physical activity into daily routines. This plan has been oriented to promote fitness throughout the Greensboro Metropolitan Area by improving facilities for pedestrian and bicycle transportation. The City of Greensboro and surrounding communities should continue to build their partnership with the Moses Cone – Wesley Long Community Health Foundation, Guilford County Department of Public Health, Guilford Health Partnership, SAFE Guilford, the Heart & Stroke Health





Partnership, and other health care organizations to promote active transportation in the region. Through this partnership, these organizations should organize community bicycling and walking for health events. These can include group rides and walks, races and runs, a downtown festival, or other activities that celebrate and promote personal fitness. The Parks and Recreation Trails Division hosts an adventure race and helps with mountain bike races and 5K races. A number of these types of activities could be organized together and advertised as “Greensboro Fitness Weekend.”

#### Use Facilities to Promote Other Causes

Network facilities could be used for events that promote other causes, such as health awareness. Not only does the event raise money/publicity for a specific cause, but it encourages and promotes health living and an active lifestyle, while raising awareness for a network facility, such as trails. Non-profit organizations such as the American Cancer Society, American Heart Association, and the Red Cross sponsor events such as Breast Cancer Walk, Diabetes Walk, Juvenile Diabetes Walk, etc. Coordination between these non-profit organizations and the Parks and Recreation Department or the MPO would make these events a success.

#### **Program and Facility Improvements/Advancements**

##### Safe Routes to Schools (SRTS)

The City of Greensboro is already in the process of applying for State Safe Routes to Schools funding to establish 6 pilot SRTS programs. These programs should combine bicycle and pedestrian facility improvements in the areas around schools with pedestrian and bicycle safety education and encouragement programs to increase the number of students walking and bicycling to school. Safe Routes to Schools programs could be expanded to other schools in Greensboro and

Guilford County. The 2005 SAFETEA-LU federal transportation bill has apportioned \$2.36 million in funding for Safe Routes to Schools Programs in North Carolina in Fiscal Year 2006. In addition, the new NCDOT Safe Routes to School Program Coordinator will be able to provide advice for the new programs in the Greensboro MPO.



Figure 5(d). Safe Routes to School event in Durham, NC (Picture from pedbikeimages.org).

##### Walk a Child to School in North Carolina

Similar to the Safe Routes to School Program, Walk a Child to School in North Carolina focuses on encouraging children to walk or bike to school. Unlike the SRTS program, Walk a Child to School in North Carolina does not provide financial or technical support for facility safety improvements, but encourages schools to sponsor a Walk a Child to School Day. This program can occur one day a year or be held for an entire week, to educate children about pedestrian safety and provide an opportunity for children to walk to school or during school to promote healthy living and combat obesity in children.

[http://www.ncdot.org/transit/bicycle/safety/programs\\_initiatives/walk2school\\_NC2001.html](http://www.ncdot.org/transit/bicycle/safety/programs_initiatives/walk2school_NC2001.html)

##### Greensboro Metropolitan Area Public Bicycle Map

As a part of this planning effort, the Greensboro MPO developed the *Greensboro Bicycle Map: A Guide to Road and Trail Conditions*. This map should be distributed widely throughout the community with the help of the MPO, municipal governments, schools, advocacy groups, and other organizations throughout the Greensboro area. Maps should be made available



at parks and recreation centers, libraries, municipal buildings, the transit center, on transit buses, and at tourism information centers. The Greensboro MPO should update the map in 3 to 5 years to reflect the bicycle, pedestrian, and greenway improvements that will be implemented through this Plan.



Figure 5(e). Public bicycle map for Winston-Salem, NC. A map for Greensboro bicyclists will inform and encourage.

### Signed Bicycle Routes

During the first year after this Plan is adopted, the City of Greensboro should do a bike route sign plan and post signs on the six recommended bicycle routes. As a part of the bike route sign plan, the City should make spot improvements to difficult locations, such as complex intersections, turning lanes, narrow shoulders, etc. so that the routes are safe for the general public to use when the signs are posted. The bike route signs can encourage more people to bicycle between their neighborhoods and Downtown Greensboro by showing them the most convenient routes to use.

### Special University-Based Programs

The Greensboro MPO should work with local colleges and universities, such as UNC Greensboro, Greensboro College, and North Carolina A&T, to

develop a comprehensive network of campus bicycle and pedestrian routes that is connected with bicycle and pedestrian facilities in the surrounding areas. UNC-G has finished a campus master plan, which addresses alternative transportation methods. A University bicycle and pedestrian system was included in the master plan, although integrating Greensboro's transit system was the larger focus. Integration with colleges and universities will allow greenway, bike, and pedestrian facilities to cater to one of the network's largest user groups.



Figure 5(f). Greensboro College "Here-to-There" signage and bicycles. Photos from <http://www.giant-bicycles.com>

Greensboro College has taken several proactive steps that are great examples to other local colleges and universities. The college sponsors a "Here-to-There" program which provides free bicycles to all students, faculty, and staff (described in more detail later). The college is also involved in an after-school program geared towards immigrant and refugee students through the Glen Haven Tutorial Center, where children have the opportunity to "Earn a Bicycle." This program promotes exercise and safety. Helmets and bicycle lockers are donated by Safe Guilford for this program.





### Pedestrian, Bicycle, and Transit Wayfinding Plan

The Greensboro MPO should work with its member jurisdictions to develop wayfinding signs that are oriented to pedestrians, bicyclists, and transit users. Within the first two years after this Plan is adopted, the Greensboro MPO should develop a wayfinding plan to achieve the following objectives:

- Show bicyclists at the Douglas Galyon Depot how to find the local signed bicycle routes
- Show pedestrians how to get from NC A&T, UNC-Greensboro, and Greensboro College to key destinations in the Downtown Area
- Show bicycle on bus users how find nearby signed bicycle routes
- Show bicyclists on signed bicycle routes how to find nearby bus stops
- Show new bus users where bus routes go (posting bus system maps at major bus stops)

The Downtown Greensboro area already has several wayfinding signs that help pedestrians find important destinations. These signs help provide useful information and add artistic character to the Downtown streetscape. As the wayfinding system becomes more established, it can be expanded into the areas outside of the City of Greensboro.

### Transportation Demand Management (TDM) / Bike User Info System

Many MPOs and TDM programs provide customized bike mapping, “commuter buddies,” and other support services to connect people who want to ride with the info they need. A bike map (both on-line and printed) with safety and intermodal connections info should be published along with route information.

### ***Incentives***

#### Energy / Fuel Savings Program

Greensboro could run an ongoing competition to see

how much fossil fuels can be saved by people bicycling and walking as part of a regional energy savings program.

### Active Living by Design

As this plan recommends, Greensboro can and should be a leader in promoting physical activity, including bicycling and walking. Sound planning and design and thoughtful implementation of the network will aid Greensboro in becoming an active and physically fit community. Active Living by Design is a national program initiated by a partnership between the Robert Wood Foundation and the University of North Carolina School for Public Health. This program is currently funding 25 community partnerships to establish innovative approaches to increase physical activity through community design, public policies and communications strategies.

<http://www.activelivingbydesign.org/>

### Youth Activities

A variety of youth activities can be created utilizing the facilities and amenities in Greensboro. Many of these ideas could also be adapted to an adult audience. Classes teaching skills for backpacking, camping, and paddling could be offered through the Department of Parks and Recreation and Greensboro’s Parks. An Adventurer Program could provide different age groups with the opportunity to go on an overnight adventure. Coordination with a nearby park, such as Hagan Stone, would be necessary to facilitate the camping experience.

Greensboro should be a city where every child has an opportunity to learn how to ride a bicycle. This can include a variety of youth programs including a Bike Camp (where kids spend a week or two cycling in the community), Recycle-a-Bicycle (where youth learn mechanical skills building bikes from recycled parts) and Learn-to-Bike programs in conjunction with





local YMCA, Boys/Girls Clubs, Scouting and other programs.

### Art in the Landscape

The inclusion of art along greenway, bicycle, and pedestrian corridors would encourage use of network facilities. It also provides a place for artwork and healthy expression to occur. Artwork could be displayed in a variety of ways and through an assortment of materials. Living artwork could be “painted” through the design and planting of various plant materials. Sculpture could be arranged as an outdoor museum. Art through movement and expression could be displayed during certain hours of the day or during seasonal events. An “Art Walk” could be established as an event along a greenway. The National Mall in Washington D.C has the National Gallery Sculpture Garden and an outdoor art museum that attracts thousands of visitors each year. Artwork can be provided by local schools, universities, special interest clubs and organizations, or donated in honor or memory of someone.

### Helmet Promotions

Giveaways and reduced-cost bicycle helmet programs are among the most common bicycle promotions. These programs are important, especially when their message is part of a balanced approach to learning the rules of the road and safe cycling techniques. Safe Guilford often donates helmets and bicycle locks to educational programs and events.

### Guided Tours and Interpretive Trails

Subjects, such as culture, history, and the environment, provide great opportunities for walking or biking tours or trails. Themed, guided tours, like night walks and moonlight bike rides, could be created with the assistance of local schools and colleges to showcase a theme in Greensboro’s history and promote the tourism industry. Currently, Greensboro has a plant identification trail, the Jesse Wharton Interpretive Trail.

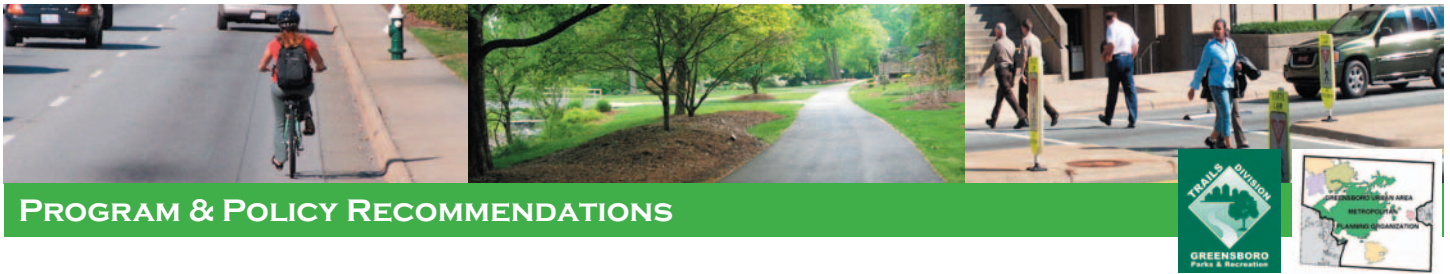
The Greensboro Parks and Recreation Trails Division also hosts the Lake Higgins Haunted Trail every fall. Greensboro can connect bicycling with the Old Greensborough historic district, museums, and other events.



Figure 5(g). Helmets are a very important part of safe cycling. Picture taken at Biltmore Estate, Asheville, NC.

### Clubs

Greensboro and the surrounding Triad area are home to a growing number of clubs for on-road and off-road cycling, walking, running, paddling, horseback riding, and even gardening. These clubs are an important community resource. Links to several local clubs are provided in the appendix of this document. To expand on an existing club idea, the Walking Wednesdays Club, a walking or running club should be created at every recreational center throughout the City. Other ideas include a Mother’s Morning Club, where moms can meet other moms for a walk or jog with the stroller, a Lunch Bunch, where workers in a larger office



complex meet over their lunch hour for a run, and a Community Gardens Club that utilizes neighborhood space alongside a greenway for gardening.

#### Free Bikes

Copenhagen, Denmark pioneered the concept of a city-wide fleet of free public bicycles. Free bikes can be a source of revenue by selling advertising on them, and they can be secured by electronic deposit systems. There are also a variety of low-tech versions of this idea, such as using recycled bicycles. This encourages many who do not own a bicycle to get out and ride. Recently, the City of Greensboro Parks and Recreation Department was awarded a Dasani grant. The Dasani “Blue Bikes” program has provided bicycle lockers and bicycles for public use at Bur-Mil Park. The City should seek out further funding to provide free bicycles at other locations throughout the Greensboro Urban Area including Downtown, other parks, and college campuses.

In the spring of 2006, Greensboro College rolled out a program to provide free bicycles to all students, faculty, and staff. Called the “Here-to-There” program, it is very unique and innovative. A group of small generous donors, including the bicycle store Cycles de ORO, made this happen. These efforts could be expanded to other local colleges as well provided the proper support from each institution.

#### “Share the Road” License Plate

The State of North Carolina has a variety of special interest license plates available for purchase. A donation to that cause or initiative is made each year, through the renewal of North Carolina State tags. A “Share the Road” License plate, which features the “Share the Road” traffic sign is now available for purchase by bicycle enthusiasts to showcase the “Share the Road” initiative.

### **5.2.4 Generating Revenues from the Bicycle, Pedestrian and Greenway System**

Greensboro can generate income from the community-wide bicycle, pedestrian and greenway system. In this day of restricted public-sector revenues, the City and community should do all that it can to derive economic benefit from this expanded network. First, the community should understand that the network is a valuable component of community infrastructure. Too often, these systems have been justified as “recreation,” “luxury,” or “add-on” types of facilities. This Plan has defined that the system will offer significant benefit to public health, safety and welfare. It will substantially improve the transportation network and will offer improved access to the outdoors for personal health and wellness management. The system, as a whole, should not be considered expendable during annual municipal or county budget considerations. It should not be regarded as something the community can do when it has the extra funds to accommodate this interest. Most importantly, if the community does not invest in the system, no economic benefit will be derived.

A substantial amount of economic benefit will be realized from improved real estate values that result from the construction of the network. The National Homebuilders Association has concluded that the proximity to trails and greenways will result in an increase of between 10% and 20% of the gross value of nearby homes. In 2005, Wake County completed an economic benefit study of its open space and greenway system, which concludes that homes in Raleigh that are in close proximity to greenspace are worth, on average, \$4,220 more than those that are not in close proximity. This added value translates into \$42 per home in additional tax revenues for the County. Charleston, West Virginia reports that its community greenway and open space system has added \$280 million in property valuation and nearly \$1 million in incremental





property tax revenues. Chattanooga, Tennessee has concluded that its community greenway system has led to an economic expansion valued at more than \$1 billion during the past decade. So, it is reasonable to conclude that if Greensboro would simply invest in its community bicycle, pedestrian and greenway system, economic benefits will follow.

Some communities also view their bicycle, pedestrian and greenway systems as community resources that can generate direct revenues. These revenues can be dedicated to offset the costs associated with maintaining the network. Hartford, CT, for example has built the Connecticut River Greenway through the downtown area. It programs this resource for activity and generates more than \$18 million in direct revenues annually. The community programs the greenway with cultural events, concerts, annual walk and run races, fishing tournaments and other related events. Grand Forks, North Dakota, admittedly, “on the way to nowhere,” has enjoyed phenomenal success as a result of its 2,000-acre greenway and trails network. The greenway is programmed for 12 months of activity, despite a 140-degree temperature swing from winter to summer. Activities are similar to Hartford, CT, and they return more than \$16 million in economic impact annually. So, again, it is reasonable to assume that if Greensboro will program its community bicycle, pedestrian and greenway system with more activity, especially activity that generates revenue, positive economic benefit will result.

The City of Greensboro and MPO should be proactive in increasing revenue from programs and events that can help fund the building, management, and maintenance of future facilities. It will be necessary for staff to be assigned to focus on programming, researching further program ideas, and work with local groups, non-profits, schools, and citizens to develop programs further. Local foundations and agencies

such as BIG (Bicycling in Greensboro), Friends of the Parks, and the Guilford Health Partnership could organize and host events.

An increase in these types of events and an increase in promotion and advertising will help increase interest and attendance. Promotion can occur through newspaper, the City website, and other local media. Currently, Greensboro Parks and Recreation has revenue-generating events including an adventure race, Lake Higgins Haunted Trail, and various bicycle and road races. Fees should be increased in events annually or biannually to increase revenue. Specific program and event ideas that are being used across the country include:

- Races/triathlons (fees and donations)
- Concessions
- Renting bicycles and other equipment
- Educational walks/Nature walks
- Fundraisers including dinners/galas
- Moonlight bike rides and walks
- Greenway parade
- Concerts
- Art events along greenway
- Events coincident with other local events such as fairs, festivals, historic/folk events, etc

### 5.3 Policy Recommendations

Existing land development and roadway design policies have a significant effect on pedestrian and bicycle transportation and recreation in the Greensboro Urban Area. These policies are established in the Guilford County Development Ordinance, City of Greensboro Unified Development Ordinance (UDO), City of Greensboro Street Design Standards, City of Greensboro Walkability Policy, NCDOT Lane and Shoulder Width Policy, and other policy documents.

The existing policies should be strengthened to improve accommodations for non-motorized transportation and





recreation facilities. Several key requirements for pedestrian, bicycle, and greenway facilities are listed below. These and other requirements for creating a safe and convenient environment for pedestrian and bicycle transportation should be integrated into policy documents for the Greensboro Urban Area. They apply to all new roadway construction and roadway reconstruction projects in urban, suburban, and village center areas, as well as in rural areas, as appropriate (e.g., areas where new developments are being constructed).

- Sidewalks should be provided on both sides of all collector, subcollector, and local streets (except for short cul-de-sacs, dead-end streets, and roadways in areas with rural development (e.g., less than one dwelling unit per 6 acres).
- Sidewalks should have a minimum width of five feet.
- The buffer space between the sidewalk and the curb and gutter should be maximized within the available right-of-way.
- Raised medians or pedestrian refuge islands should be provided, where practical, at crosswalks on streets with more than three lanes, especially on streets with high volumes of traffic. They should be six to ten feet wide.
- Bicycle lanes should be provided, where practical, on collector and arterial roadways. They should be at least five feet wide (width may include the gutter pan if it is flush with the pavement surface). Where there is not enough roadway width available for bicycle lanes, other treatments should be used to improve conditions for bicyclists.
- Paved shoulders should be provided on rural roadways with moderate to high traffic volumes. There is no minimum width for paved shoulders, but a width of at least four

feet is preferred.

- Roadway travel lane widths should not be excessively wide. Local and collector roadways should generally be striped with 10-foot travel lanes. Arterial roadways should have 10- or 11-foot travel lanes, depending on traffic volume and use by heavy trucks.
- Pedestrians and bicyclists should be accommodated on roadway bridges, underpasses, and interchanges and on any other roadways that are impacted by a bridge, underpass, or interchange project (except on roadways where they are prohibited by law). All new bridges (including those being constructed as a part of the Urban Loop project) should be constructed with bicycle lanes and wide sidewalks.
- On multi-lane roadways with excess existing and future traffic capacity, underutilized travel lanes should be removed. This extra right-of-way space should be used for bicycle and pedestrian facilities.

Justification for these requirements is provided in Appendix C - Design Guidelines. More detailed descriptions of these and other recommended changes to specific policy documents are provided in the sections below.

### 5.3.1 Guilford County Development Ordinance

At the present time, the concept of providing a balanced transportation system throughout the Urban Area is supported by the vision of the Greensboro Urban Area 2030 Long Range Transportation Plan. However, this concept is not adequately supported by the detailed regulations that control development throughout the Urban Area. As a result, there is a lack of requirements and design guidance for sidewalks, greenways, and bikeways.



The communities of Oak Ridge, Pleasant Garden, Sedalia, and Stokesdale currently follow the regulations outlined in the Guilford County Development Ordinance (1999). Summerfield already has several good examples of pedestrian and bicycle elements in its own development ordinance (see Appendix A). All five communities in the Urban Area should work with the Guilford County Planning and Development Department to update the County ordinance so that it better addresses pedestrian and bicycle transportation.

The Guilford County Development Ordinance has a mixture of good provisions for pedestrians and bicyclists, as well as a number of factors that are in need of revision. This county ordinance and other future municipal subdivision ordinances should be revised as described below.

### 1. Land use mix and density

Section 4 of the county development ordinance should be revised to facilitate developments that have sufficient density and a mix of land uses to increase the convenience of non-motorized travel. The resulting development pattern would provide services and other activities (e.g., recreation facilities, schools, shopping areas, community services, etc.) within walking and bicycling distance of residences. To provide a sense of scale, a typical walking distance is one-quarter mile. In addition to supporting non-motorized transportation, compact developments are a more efficient use of resources because they do not take up as much land area and require less public infrastructure and services (e.g., roads, sewer lines, police and fire protection, etc.) than sparse, segregated-use developments.

### 2. Sidewalks

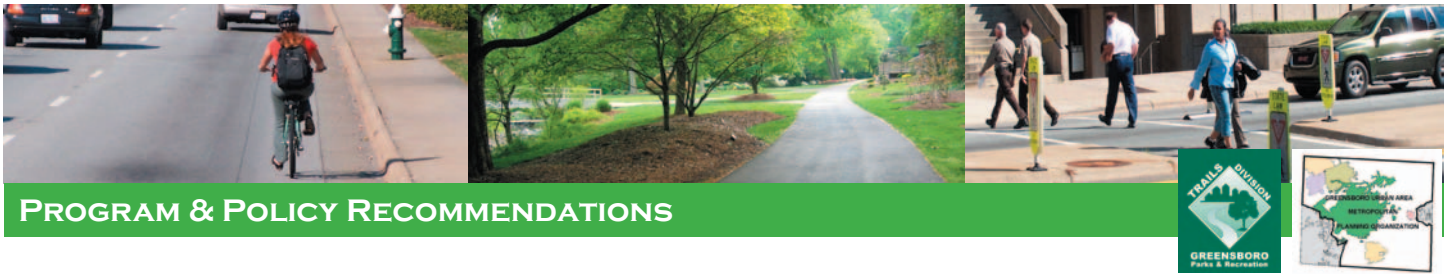
The existing sidewalk requirements in the Guilford County Development Ordinance are insufficient and should be strengthened. Sidewalks should be provided on both sides of all collector, subcollector,

and local streets (with the exception of short cul-de-sacs, dead-end streets, and roadways in areas with rural development (e.g., less than one dwelling unit per 6 acres)) and have a minimum width of five feet. This will provide better pedestrian accommodation than the current requirements to be only on one side of the roadway (5-13.5) and be only four feet wide on private streets (5-13.3.G.6).

A five-foot sidewalk width is very important, as it enables two people to walk side by side, which is not possible on 4-foot wide sidewalks. Many other jurisdictions have increased their minimum sidewalk width to 5'. In addition, new rules that will be issued by the U.S. Access Board in the near future will require that 4' sidewalks provide a 5' passing area (a wider area where two wheelchairs can pass) every 200'. Additional sidewalk width is particularly important for locations with higher volumes of pedestrian activity, such as near schools, shopping centers, parks, and other pedestrian attractors. In these locations, it would be beneficial to require sidewalks that are six feet wide (or wider).

Sidewalk setback from the street should also be included in the development ordinance. Pedestrians feel more comfortable when there is a greater buffer between the sidewalk and the street, particularly when the roadway serves high volumes of traffic. (Therefore, developers should be required to provide a buffer of at least 3 feet on local streets, at least 5 feet on collector roadways, and at least 7 feet on arterial roadways.)

Sidewalk cross-slope requirements should also be specified in the county development ordinance. The Americans with Disabilities Act (ADA) allows no more than a 1:50 cross slope (2%) and no more than a 1:20 running slope (5%) (unless the slope is a ramp, which can have a maximum running slope of 1:12 (8.33%)).



### 3. Street trees

Street trees should be encouraged and required where appropriate between the sidewalk and the street along all new roadways in new developments, and are recommended, where possible, on all other roadways. While it may not be possible to plant street trees on some roadways with heavy traffic and narrow rights-of-way, they are important for improving roadway aesthetics and the pedestrian environment, and they should be provided wherever possible. Street trees greatly improve pedestrians' feeling of comfort and safety in the roadway environment. Large shade trees such as Ginkgo, Chinese Elm and Japanese Zelkova are preferred over medium and small trees (such as Bradford Pear) that do not offer as much shade. It is also important to consider potential utility conflicts (both overhead and underground) when planting street trees. Understory trees can be effective in these locations. Street trees should typically be placed no closer than 30 feet on center, and no greater than 60 feet on center, depending on the species of tree. In locations with no buffer strip, consideration can be given to providing tree planting behind the sidewalk, which may improve aesthetic conditions and provide shade, but will not improve pedestrians' sense of safety in the roadway environment.

For narrow landscape buffers less than 5 feet wide, care should be taken to use shade tree species that can survive in a narrower space and have less invasive root systems, such as varieties of Chinese Pistache and Maple trees.

### 4. Greenway trails

Greenway trails, or shared use paths, should be built to facilitate convenient access between homes and nearby destinations such as parks, schools, shopping areas, and adjacent subdivisions. These trails should provide internal connectivity within the development and also connect to adjacent developments. Shared-

use paths should meet minimum American Association of State Highway and Transportation Officials (AASHTO) guidelines and be a minimum of 10' in width and constructed of either asphalt or concrete. Connector trails that are anticipated to serve fewer pedestrians and bicyclists may be reduced to 8' in width. Recommended greenways in this Plan should be constructed as part of new development. Strategies and incentives for acquiring land and developing these greenway trails are discussed in Chapter 7 - Implementation.

### 5. On-road bicycle facilities

The county ordinance should require 5-foot-wide bike lanes (in urban/suburban areas—where curb and gutter is used) and 4-foot-wide paved shoulders (in rural areas—where ribbon pavement is used) on both sides of all roadways that serve more than 1,500 vehicles per day. For roads that are projected to carry higher volumes, bike lane and shoulder widths should be increased. Specifically, this should be done by adding additional bicycle lane and shoulder requirements to the street width standards portion of Section 5-13.3 of the Guilford County Development Ordinance.

### 6. Bicycle parking

Guilford County should adopt a bike parking ordinance that requires private developers to provide bike parking at key destinations for bicycling. Key destinations include parks, libraries, shopping centers, and transit centers. Bike parking ordinances have been adopted by communities throughout the U.S. – an excellent resource for a model bike parking ordinance is the Association of Pedestrian and Bicycle Professionals' Bicycle Parking Guidelines, which can be accessed at [www.bicyclinginfo.org](http://www.bicyclinginfo.org).

The County should also investigate the possibility of installing bike storage lockers at commuter parking lots. Bike lockers provide long term, secure bike





parking, and are usually made available through long-term rentals (i.e., 3 to 6 months).

## 7. Travel lane width

In general, the minimum roadway width requirements for urban areas in the county ordinance (5-13.3) should be updated to ensure that new local and collector streets are not built excessively wide, as has been the practice in the past. Wide streets make it easier for drivers to travel at higher speeds – more appropriate widths will help to traffic-calm local and collector streets and make conditions safer for pedestrians and bicyclists. Specifically, minimum widths, exclusive of bicycle lanes, edgelines, or shoulders as referenced in section 5, should be changed to the following:

- Major thoroughfare: Existing minimum: 64 to 68 feet; Recommended minimum: 44 feet (to allow for a four-lane roadway with 11-foot lanes)
- Minor thoroughfare (five lanes): Existing minimum: 60 feet; Recommended minimum: 50 feet (to allow for a five-lane roadway with 10-foot lanes)
- Minor thoroughfare (four lanes): Existing minimum: 48 feet; Recommended minimum: 40 feet (to allow for a four-lane roadway with 10-foot lanes)
- Minor thoroughfare (three lanes): This category should be added, and its minimum should be 30 feet (to allow for a three-lane roadway with 10-foot lanes)
- Collector: Existing minimum: 40 feet; Recommended minimum: 36 feet (to allow for a two-lane roadway with 10-foot lanes and 8-foot on-street parking areas)
- Local residential and residential cul-de-sac (with curb and gutter): Existing minimum: 30 feet; Recommended minimum: 20 feet (to allow for a two-lane roadway with 10-foot lanes and no on-street parking)

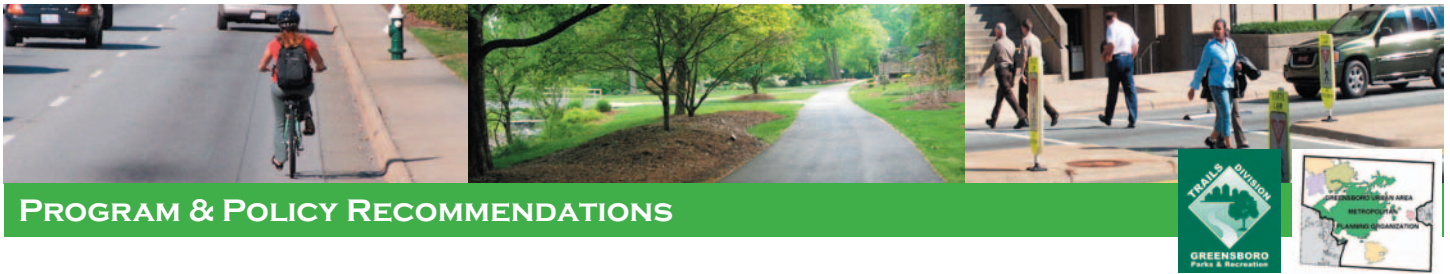
It is important to note that, as minimums, these roadway widths are to be used for roadways that tend to have fewer large trucks, lower traffic volumes, and lower speeds. They should not be followed for the busiest roadways in a functional classification or on roadways that are recommended for bicycle facilities. As discussed above, the County's roadway width standards should require enough roadway width to provide appropriate on-road bicycle accommodations (e.g., bicycle lanes and paved shoulders on arterial and collector roadways; slow-speed shared travel lanes on low-volume streets).

## 8. Driveway design

An accessible route of 48" minimum width must be maintained across driveways. In most cases, driveway aprons (the sloped area at the end of driveways) should not extend through the sidewalk area of the driveway, which must be maintained at a maximum 2% cross slope. However, alternatives exist to achieve these slope requirements (see the *Revised Draft Guidelines for Accessible Public Rights-of-Way* published by the US Access Board in November 2005). In addition, it is recommended the concrete sidewalk should be extended across driveway cuts to maintain the continuity of the sidewalk and reinforce to the driver that he/she must yield to pedestrians at driveways (which is required by law).

## 9. Curb design

"Rolled" or valley curbs should not be permitted in Guilford County in the future. Rolled or valley curbs are angled curbs that are often preferred by developers because they do not require a driveway cut and thus reduce development costs. However they enable drivers to park on the sidewalk easily, and otherwise degrade the aesthetic qualities of residential streets. These types of curbs are discouraged in the County where serviced by Greensboro water and sewer. Other locations in the County use ribbon pavement.



## 10. Pedestrian and bicycle circulation plan

Each commercial and residential development plan should include a pedestrian and bicycle circulation plan, which should identify main trails and connector trails as well as sidewalks and on-road bike lanes and other bicycle facilities, such as bicycle parking and connections to existing bicycle routes.

## 11. Connections between developments

A provision should be included in the county development ordinance that requires that the non-motorized facilities built as a part of a subdivision project be extended beyond the limits of the subdivision boundaries (up to 300') to connect to logical termini, where such a connection can be achieved in the public right-of-way, with the goal of reducing gaps in the network. In addition, it will be important for local planners to provide “hands on” guidance to ensure that pedestrian and bicycle facilities have continuity between adjacent developments.

## 12. Lighting

Additional lighting requirements to improve the safety of pedestrians should be included in Section 6 of the development ordinance. These requirements include lighting for sidewalks and greenway trails as well as adequate lighting at intersections and other pedestrian and crossing areas.

Pedestrians are adversely affected by low-light conditions: two-thirds of pedestrian fatalities occur between dusk and dawn. Lighting is important at intersections and midblock crossings, particularly in locations near transit stops.

In pedestrian-oriented areas, it is important to provide a higher quality of pedestrian lighting, particularly along sidewalks and walkways with higher volumes of night-time pedestrian activity, specifically in commercial pedestrian districts, in high density residential areas,

and near colleges and universities. Street illumination levels should be determined by the type and intensity of adjacent development (see Table 4(g) in Chapter 4). Additional information was provided in Section 4.4.3.

## 13. Traditional Neighborhood Zoning Category

These recommended changes would incorporate several basic requirements to support pedestrian and bicycle transportation. Guilford County should also update its Development Ordinance to include a Traditional Neighborhood zoning category that is consistent with NCDOT Traditional Neighborhood Design Guidelines (2000) to incorporate additional pedestrian and bicycle requirements.

### 5.3.2 City of Greensboro Land Development Ordinance and Street Design Standards

As part of its Connections 2025 Comprehensive Plan implementation efforts, the City has embarked on two interrelated projects: a Land Development Ordinance Rewrite, and a revision to the City Street Design Standards. The goal of the Land Development Ordinance project is to provide an updated ordinance that better reflects the recommendations of the Comprehensive Plan while providing more flexible options for development proposals and streamlining current district requirements. This project provides an opportunity to facilitate the creation of dense mixed-use projects that would tend to build off of and support pedestrian and bicycle transportation and recreation. It also addresses the issue of greenway acquisition in drainageways.

The goal of the street design standards project is to develop revised standards based on current knowledge and experiences in peer communities to better reflect actual community street design needs – including for managing traffic and traffic speed and improving pedestrian and bicycle accommodation. The results may include changes in some requirements such as reducing minimum widths for local residential streets,





requiring sidewalks on both sides of streets, requiring bicycle lanes on arterial and collector roadways, and requiring tighter turning radii and other geometric features to help calm traffic.

Collectively the two projects provide an opportunity for the community to support its goals for improving the pedestrian and bicycle environment in Greensboro. Recommendations for incorporating pedestrian, bicycle, and greenway accommodations in these projects are listed below.

### **City of Greensboro Unified Development Ordinance (UDO)**

The City of Greensboro is developing a new Land Development Ordinance (LDO) that will replace the current Unified Development Ordinance (UDO). Since the estimated completion date of the new LDO is early 2007, this policy review addresses the current UDO. The purpose of this review is to make recommendations for changes, with the intent that they be considered during the current ordinance rewrite.

#### **1) Change Definition of Traffic**

Throughout the UDO, the term “traffic” should be redefined as follows:

“Pedestrians, motor vehicles, bicycles and other conveyances either singly or together using any highway, street or public right-of-way for purposes of travel.”

This may seem like a minor semantic issue, but it is significant because of the number of times this term appears throughout the code, therefore making pedestrians and bicycles applicable in those sections. The language is based on a combination of the Uniform Vehicle Code (UVC - Uniform Vehicle Code § 1-207 Traffic), the national model code that forms a basis for most state codes, and the North Carolina General

Statutes (NC General Statutes, Chapter 20, §.20.4.01 (49) Vehicle). The NC Statutes do not include a definition of the term traffic, but they do define a bicycle as a vehicle. The UVC includes a broad definition of traffic, but does not explicitly mention bicycles.

#### **2) Modify Zoning Regulation Purposes (30-1-3.2)**

Revised section: “(I) Require appropriate setbacks for buildings and other structures to facilitate the safe movement of vehicular and pedestrian traffic, provide adequate fire lanes, and ensure adequate distance from dust, noise, and fumes created by vehicular traffic.” Add the word “bicycle” along with “pedestrian traffic.”

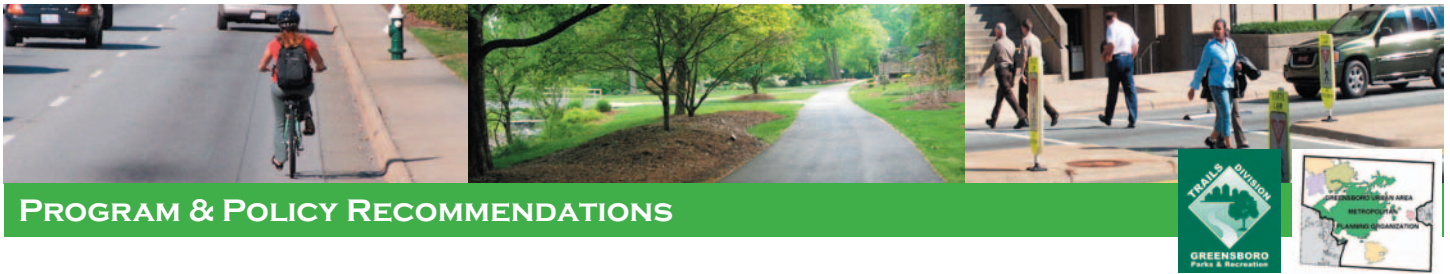
#### **3) Flood Damage Prevention Purposes (30-1-3.14)**

Greenways should be regarded as the “highest and best use” of floodplain land, as they create a multi-functional landscape that is beneficial to the entire community. With the installation of dual purpose trails/maintenance roads, the floodplains would be fully accessible for flood management purposes. Greenways will also serve to enhance property values of adjacent lands, and they will provide beneficial water quality enhancement to surface water flow. The UDO should reflect the multiple benefits that a greenway system, developed in conjunction with the floodplain management system, can provide.

#### **4) Subdivision Regulation Purposes (30-1-3.8)**

The subdivision regulations in the UDO aim to provide for, among other things, “the distribution of population and traffic in a manner which shall avoid congestion and overcrowding,” and “the dedication or reservation of recreation, park, and greenway areas.” These statements support the provision and maintenance of bicycle, pedestrian and greenway systems.

The City should expand Section 30-1-3.8 to include a provision that requires that the non-motorized facilities



built as a part of a subdivision project be extended beyond the limits of the subdivision boundaries (up to 300 feet) to connect to logical termini, where such a connection can be achieved in the public right-of-way, with the goal of reducing gaps in the greenways, pedestrian, and bicycle facility network.

#### **5) Article 2 of UDO – Definitions and Clarifications**

Greenway is a public utility or green infrastructure providing a linear ecological and recreational facility and service; linear open space established along either a natural corridor, such as a riverfront, stream valley, or ridgeline, or along a man-made corridor, such as a railroad right of way, a canal, scenic road, or other route converted to recreational use; any natural or landscaped course for pedestrian or bicycle passage; an open space connector linking parks, nature reserves, cultural features, or historic sites with each other and with populated areas; locally, certain strip or linear parks designated as parkway or greenbelt. Define “traffic” and “transportation” to include pedestrians and bicycles/cyclists (see note above for recommended traffic definition).

Add the following destinations to the list of “specified pedestrian destinations”: high-density residential areas, civic buildings such as libraries, post offices, City Hall, etc., downtown and/or historic districts, and pedestrian overlay areas.

#### **6) Article 3 – Make the following revisions:**

##### **Fee in Lieu of Required Sidewalk Installation (30-3-9.5)**

The UDO currently states: “To the extent that the conflict which necessitated the fee-in-lieu is eliminated by cancellation or alteration of the conflicting roadway project, funds submitted for construction of sidewalks in coordination with said project shall be refunded to the developer.” Add: “...for the purpose of installing

said sidewalks.” This addition ensures that the funds originally set aside for the required sidewalks are still used for that purpose.

##### **Submission of Site Plans (30-3-11.2)**

The required Traffic Impact Study (TIS) should take into account bike and pedestrian needs. Also, depending upon the scale or complexity of the development, the Technical Review Committee should be able to request a bicycle and pedestrian circulation plan.

##### **Street and Utility Construction (30-3-11.5)**

The UDO states: “None of the improvements listed above shall be constructed until the street and utility construction plans for such improvements have been reviewed and approved by the City.” Add: “Such improvement plans shall comply with existing City plans.” This will ensure compliance with previously adopted plans, including bicycle, pedestrian, and greenway initiatives.

#### **7) Article 4 – Make the following revisions:**

##### **Pedestrian Scale Overlay Districts (30-4-4.7)**

This section contains many pedestrian friendly requirements that could be carried over into other districts for improving the overall pedestrian environment of Greensboro. Those requirements include, but are not limited to, the language used in the following Pedestrian Scale Overlay District sub-sections: Building Setback and Set-to Lines; Signs, Building Lighting, Screening, Spacing and Number of Vehicular Access Points, Cross Access, and the standards set forth for Pedestrian Sidewalks, particularly the standard 5-foot minimum width.

#### **8) Article 5 – Make the following revisions:**

##### **Sidewalks (30-5-1.5)**

Sidewalks should be provided on both sides of all





collector, subcollector, and local streets and have a minimum width of five feet.

#### **Landscaping and Tree Preservation Requirements (30-5-4)**

Landscape requirements should be flexible to accommodate the placement of sidewalks within applicable “planting yards.” In some cases, a planting yard may need to be split in order to accommodate a sidewalk. In other cases, a planting yard requirement may need to be waived to accommodate a sidewalk.

#### **Park and Shuttle Lots (30-5-2.615)**

These lots should include bicycle racks for short-term storage, and, when necessary, should include bicycle lockers for long-term storage. GDOT and GTA should work together to determine the appropriate level of accommodation (see section 7.6 below).

#### **Public Parks (30-5-2.65)**

Public parks should provide bicycle racks wherever automobile parking is provided.

#### **Public Recreation Facilities (30-5-2.66)**

Public recreation facilities should provide bicycle racks wherever automobile parking is provided.

### **9) Article 6 – Make the following revisions:**

#### **Submission of Plans (30-6-5)**

As noted above in section 5.4.3, the required TIS should take into account bike and pedestrian needs. Also, depending upon the scale or complexity of the development, the Technical Review Committee should be able to request a bicycle and pedestrian circulation plan.

#### **Sidewalks (30-6-13.5)**

Sidewalks should be provided on both sides of all collector, subcollector, and local streets and have a

minimum width of five feet.

#### **Street Trees (30-6-13.11)**

The installation of street trees should also take into consideration corridor constraints, traffic flow, accommodation of bicycle and pedestrian travel and other space restrictions. The ordinance should establish minimum requirements for where and when street trees should be installed.

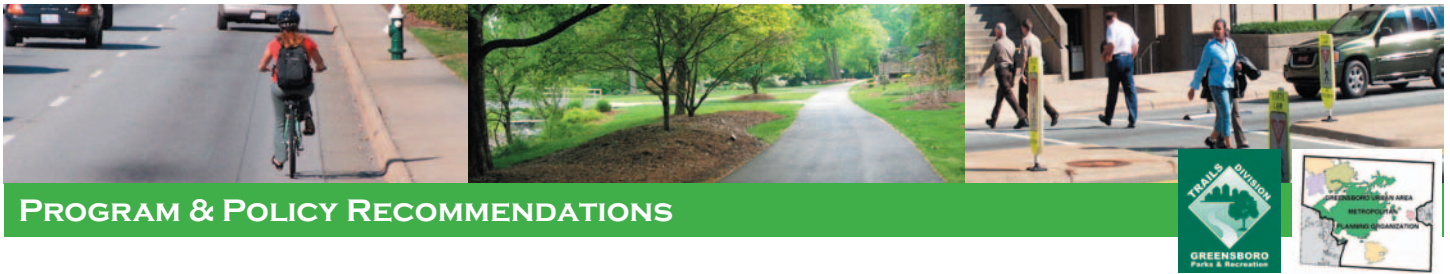
#### **10) UDO Rewrite**

The recommended modifications to the UDO (section 5.3.2) should be submitted to the project officer and consultant preparing the Land Development Ordinance rewrite.

#### **Policy on Drainageways and Greenways**

Greensboro has a progressive history when it comes to setting aside land for drainage and floodplain management. The City is developing a new Land Development Ordinance that will address the way in which drainage and floodplain management will be handled in years to come. Greenways are complementary elements of the overall drainage and floodplain infrastructure and the City would be well served to incorporate the goals and objectives of the greenway system into its water quality and flood management programs. Communities like Raleigh, Charlotte, Louisville, KY and Tulsa, OK have already accomplished this integration and are regarded as some of the most progressive drainage, stormwater and flood management programs in the nation.

Historically, greenways have been narrowly defined as recreation corridors. This limited definition fails to capitalize on perhaps their greatest benefit; conservation of land for the storage and management of floodwaters. In fact, when one examines the history of how community greenway programs were created in places like Raleigh, Louisville and Tulsa, it becomes



clear that responding to flooding and water quality concerns were some of the most important reasons why these communities created their greenway networks.

Raleigh has used its greenway system to set aside and protect thousands of acres of valuable floodplain land. After Hurricane Floyd dumped significant rainfall on the Capital City, former City Manager Dempsey Benton observed that damages from flooding would have been significantly higher had the land not been conserved as open space through the greenway program.

Charlotte and Mecklenburg County created the Surface Water Improvement and Management Program (SWIM) to monitor and improve water quality within the 2,000 plus miles of streams that flow throughout the County. The Mecklenburg County Greenway program is an integral part of SWIM, primarily because it creates the landscape buffers along streams, lakes and rivers that are needed to cleanse pollutants from non-point discharge flows.

Tulsa, OK incorporates recreation, open space, and trail project development into most of its community flood management projects. For example, stormwater detention basins, dry except during floods, are used for soccer fields and other recreational activities. Along stream channels, the city has built trails that also serve as maintenance roads, and are used for hiking and biking trails, which are linked with other trails into a community-wide network. The community greenway program has had a dramatic financial impact on the Federal Emergency Management Agency (FEMA) insurance program, lowering flood insurance rates throughout the community.

Louisville, KY has used its greenway program as the basis for not only floodplain management, but also water quality enhancement. The Louisville-

Jefferson County Metropolitan Sewer District adopted a comprehensive greenway plan in 1994, and used this as a basis for defining an environmentally friendly floodplain management program. Now organized by watershed, the agency evaluates holistic changes to land use and the incremental impact that stormwater flow has on surface streams and rivers.

Greensboro is grappling with how to best define drainage and floodplain management within the UDO. Greenways are not fully integrated into the overall framework of the discussion. Learning from the successful strategies of other communities, Greensboro should embrace greenways as a core solution for floodplain management.

- 1) The City should craft a joint-use acquisition instrument, similar to what both Raleigh and Charlotte-Mecklenburg use, to obtain rights-of-way for both floodplain management and greenway use.
- 2) The City should adopt a trail development policy similar to Louisville and Tulsa where trails become maintenance roads, and therefore an important element of infrastructure for accessing and maintaining the floodplain system.
- 3) The City should model watersheds and subwatersheds for a fully urbanized condition, considering the effects that future land development practices upstream and throughout the watershed will have on future downstream flooding.

The following graphics illustrate a variety of floodplain conditions that support proper stormwater management and would also include the integration of greenways. The 150-foot measurement is based in science and is derived from work that North Carolina State University (NCSU) completed, examining the effects of pollutants that migrate through the soil and into adjacent streams.





NCSU concluded that the minimum vegetated buffer width required to absorb these pollutants was 150 feet (Figure 5(h)).

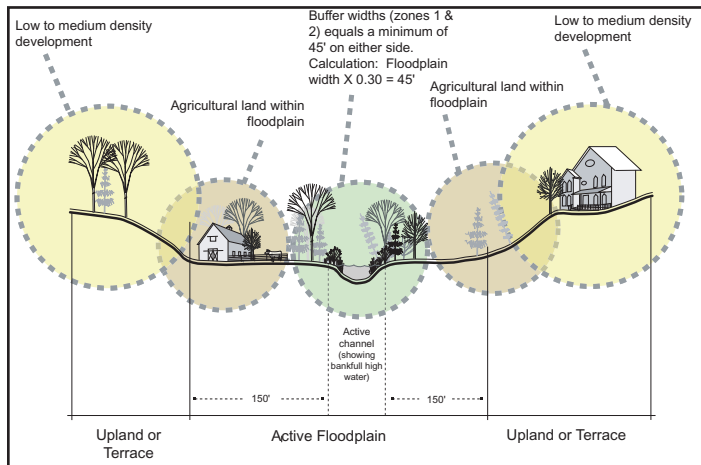


Figure 5(h). 150-ft buffer floodplain.

Smaller buffers are also indicated in these graphics based on a variety of urban stormwater work that has been completed around the nation. The 35-foot width for a vegetated buffer along urban streams is believed to be the minimum necessary to protect trees and vegetation. This can help to offset stream bank failure. The ability of a 35-foot vegetated buffer to mitigate non-point source pollution is unproven (Figure 5(i)).

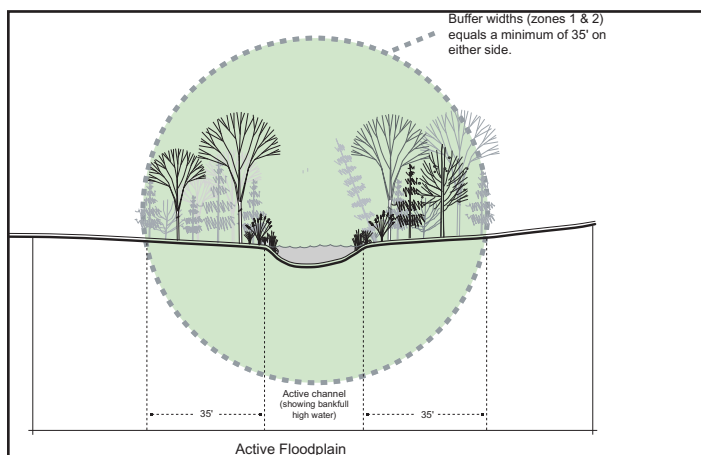


Figure 5(i). 35-foot urban vegetated buffer floodplain.

Finally, the City of Tulsa has been building trails/maintenance roads within 15 feet of the top of stream bank as a way of providing access to these streams for stormwater and water quality management purposes. This would be the minimum recommended distance for these trails. It is not recommended that 15 feet be a constant width, and in fact trails should meander toward and away from streams (Figure 5(j)).

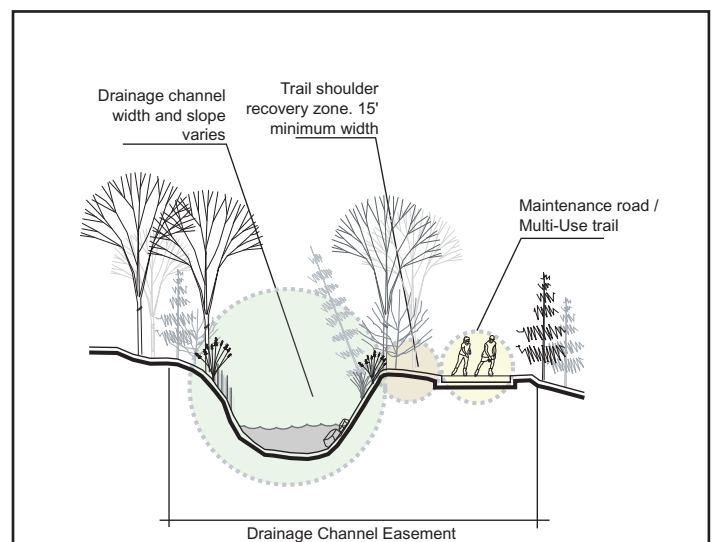
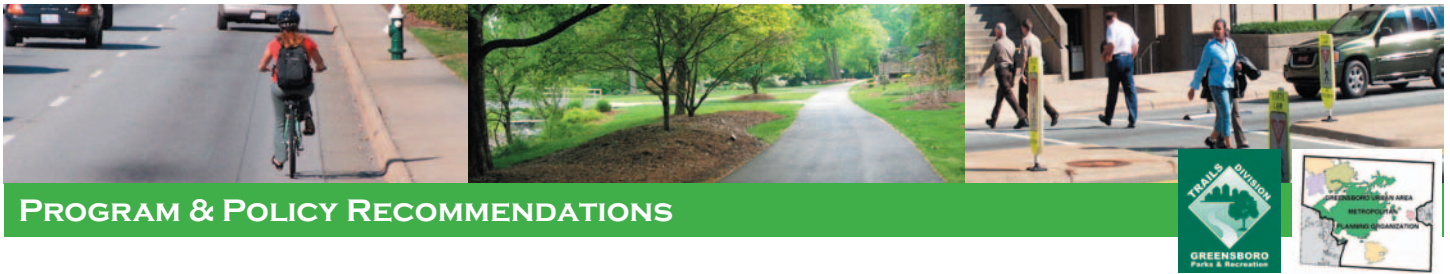


Figure 5(j). Greenway and maintenance road 15 feet from top of stream.

### **City of Greensboro Street Design Standards**

The City of Greensboro is in the process of updating its street design standards. During this process it will develop guidelines for street characteristics such as lane widths, design speed and posted speed, turning radii, raised medians, bicycle lanes, and sidewalks. These features all have a significant influence on the safety and convenience for pedestrian and bicycle travel. Therefore, the new street design standards should be updated so that future roadway improvements will be supportive of all types of roadway users, including pedestrians and bicyclists.

Key concepts found throughout this plan (e.g., providing



sidewalks on both sides of roadways, including bicycle lanes on collector and arterial roadways, using lower design and posted speeds on roadways with pedestrians and bicyclists, reducing turning radii in areas with large numbers of pedestrians, utilizing narrower travel lane widths, where appropriate) should be incorporated by the City street design standards committee into the updated document. Many of these important concepts are described in detail in the pedestrian and bicycle facility guidance (Appendix C) and in Section 5.3.1. Future updates to the City of Greensboro street design standards should continue to improve roadway design practices for accommodating pedestrians and bicyclists.

### 5.3.3. The City of Greensboro Sidewalk Construction Program

The City Sidewalk Construction Program includes four elements: 1) sidewalks built as a part of development projects, 2) a sidewalk petition program for residential streets, 3) a program to include sidewalks as a part of roadway improvement projects, and 4) a program to retrofit high-priority locations with sidewalks. Since 2002, approximately 60 miles of sidewalks have been constructed, and 140 miles have entered the design process. Specific information about the Sidewalk Construction Program is provided in Appendix F, City of Greensboro Sidewalk Construction Program Procedures.

The City Sidewalk Construction Program is critical for extending the sidewalk network through the community. Efforts to include sidewalks on NCDOT projects are equally important, especially where such projects involve bridges.

Current sidewalk projects include:

- 27 miles of City roadway-related sidewalk projects in the project development process.
- Approximately 7 miles of NCDOT roadway-

related sidewalk projects in the area.

- 70 miles of City priority sidewalk projects in various stages of design, property acquisition, utility relocation and construction.
- Approximately 20 miles of sidewalk are included in current city construction projects. Another 75 miles of sidewalk are in various stages of design, property acquisition, or utility relocation.



Figure 5(k). A new sidewalk in a new development in East Greensboro.

The City has financed sidewalk construction through a mix of transportation bond funds and Powell Bill funding balances (reserves accumulated through past years). However, both of these funding sources are not guaranteed to be available consistently in the future. Some federal and state transportation funds have been used for sidewalk construction (as part of state roadway projects or standalone sidewalk projects funded through the NCDOT and the MPO). These funding levels will also vary from year to year. **It will be critical for the City to secure additional resources in the future to support continuing sidewalk construction and maintain progress towards making Greensboro more walkable.**





Potential funding sources are discussed in Appendix D - Funding.

### 5.3.4 The City of Greensboro Sidewalk Ordinance

Building upon the foundation laid by the Walkability Policy, GDOT staff worked with staff from the Planning Department, as well as representatives of the development and real estate industries, public health and safety agencies, and members of the general public to develop a package of proposed amendments to the City's sidewalk installation requirements as specified by the Unified Development Ordinance (UDO). Collectively referred to as the "Sidewalk Ordinance Amendment," this series of proposed revisions to the UDO was adopted by Greensboro City Council on December 3, 2002. The new requirements took effect January 1, 2003 and have made a substantial contribution toward improving pedestrian safety, access, and circulation throughout the City.

These amendments were carefully crafted to significantly increase the amount of sidewalk that is required to be installed in conjunction with new development, re-development or subdivision projects. Current requirements provide for sidewalk on both sides of thoroughfares, two sides on higher level collector streets and collector streets connecting to a range or specified types of destinations, and on one side of other collector and most local streets. Private streets are not included in these requirements. **Further strengthening of the ordinance is recommended to better address the community's walkability needs. This includes requiring sidewalks on both sides of all streets, with the exception of short cul-de-sacs and dead-end streets.** Additional justification for this strengthened sidewalk policy is provided in Appendix C.

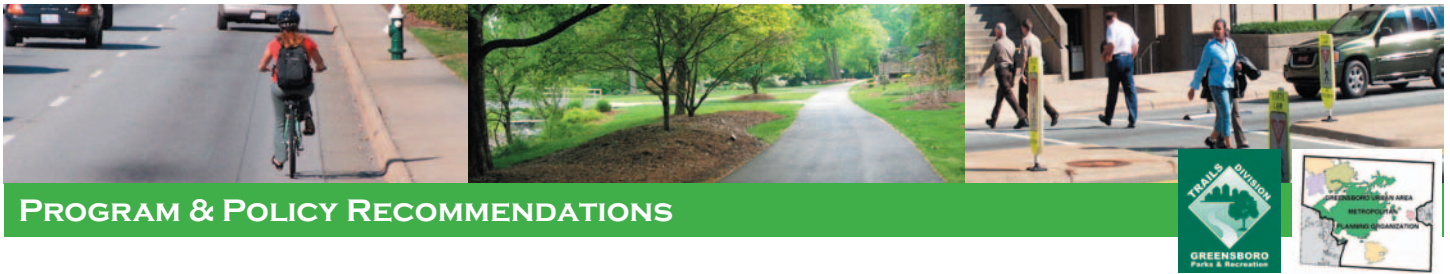
### 5.3.5 Sidewalk Maintenance

The City of Greensboro is facing a backlog of sidewalk maintenance needs. Using the information from the GIS-based sidewalk inventory, it is estimated that 70 miles of sidewalk are classified as good, 230 miles are classified as fair, and 70 miles are classified as poor. While the City's current sidewalk maintenance efforts are able to address some of the worst conditions, the City should establish a dedicated funding source to provide additional resources for maintenance, allowing the City to focus on addressing all sidewalks in poor condition. A similar funding source should be set up by the MPO to maintain sidewalks in unincorporated areas. Additional information about sidewalk maintenance tasks and responsibilities is provided in Chapter 7.

### 5.3.6 NCDOT Lane and Shoulder Width Policy *Lane Width*

The NCDOT lane width policy for resurfacing, restoration, and rehabilitation projects was updated in April 2004. This policy requires local and collector roadways with traffic volumes of over 2,000 ADT (current traffic volume) to have lanes that are at least 11 feet wide. Arterial roadways with traffic volumes of over 2,000 ADT are required to have lanes that are at least 12 feet wide. Narrower lanes can be used on roadways with lower traffic volumes and speeds.

This policy should be made more flexible. This includes allowing 10-foot travel lanes on local and collector roadways with higher traffic volumes and on arterial roadways in appropriate situations (such as lower-speed roadways with low volumes of heavy trucks). By using 10-foot travel lanes in appropriate locations, the Greensboro MPO will have a greater ability to accommodate pedestrians and bicyclists in constrained roadway cross-sections. This includes making room for bicycle lanes and shoulders, shortening roadway crossing distances, providing



space for median crossing islands, etc. Additional justification is provided in Appendix C, Pedestrian and Bicycle Facility Guidelines.

#### *Paved Shoulder Width*

The existing NCDOT policy for paved shoulder width was established in April 2003. This policy is based on a study of construction, maintenance, safety, operational, and economic issues related to the use of paved shoulders. The policy states that engineering judgment may be used to determine the need for greater shoulder width on a case-by-case basis.

The NCDOT policy states that 4-foot minimum paved shoulders should be provided on all four-lane (or more) arterial and collector roadways. Freeways and other major roadways with higher traffic volumes should have 10-foot minimum paved shoulders. Two-lane, two-way roadways with over 8,000 ADT (design year traffic volume) should also have 4-foot minimum paved shoulders. Two-lane, two-way roadways with 4,000 to 8,000 ADT should have 2-foot minimum paved shoulders, and two-lane, two-way roadways with less than 4,000 ADT are not required to have paved shoulders. The policy states that bicycle routes (regardless of traffic volume) should be considered for four-foot minimum shoulders. In the future, NCDOT should provide funding for projects to ensure that its paved shoulder policy is followed.

In the Greensboro Metropolitan Area, paved shoulder width is particularly important because many of the NCDOT roadways are in areas that have been developed recently or will soon be developed for residential, commercial, and industrial use. Wider shoulders are needed so that the roadways can serve the growing numbers of bicyclists, pedestrians, and motorists safely in these areas. Therefore, it is recommended that four-foot minimum shoulders be provided on roadways in the Greensboro Metropolitan

Area with over 1,000 ADT (current traffic volume). These shoulders should be provided as a part of roadway construction, reconstruction, and repaving projects. Where four feet can not be achieved in the short-term, the widest shoulder possible should be provided. Roadways that are designated as current and potential future signed bicycle routes should all have four-foot minimum shoulders, with greater width preferred.

#### **5.3.7 Greensboro Transit Authority: Transit, Bicycle and Pedestrian Interaction**

This Plan recommends that the Greensboro Department of Transportation (GDOT) and the Greensboro Transit Authority (GTA) continue to work together in order to achieve the following:

- 1) GDOT and GTA should identify bus stops and other transit locations for bike racks, providing short-term bicycle storage, and for lockers, providing long term storage. Some possible locations include bus stops, park and ride lots (managed by the Piedmont Authority of Regional Transportation), and at the Depot on East Washington Street.
- 2) GDOT and GTA should coordinate and enhance their signage system. GTA could redesign bus route signs by including references to nearby bike routes or redesign its bus route map to include the City's signed bicycle routes. Likewise, bike route signs could be redesigned to point to nearby bus routes.
- 3) Bike-On-Bus ridership should continue to be counted and recorded



with the purpose of tracking ridership growth over time. This would require improving the current counting system to count bicycles not only when the rack is deployed but also the actual number of bikes carried.

- 4) GTA should distribute bike route maps at all locations where transit information is provided.
- 5) GDOT and GTA should identify roadway crossing improvement needs, particularly near transit stops.
- 6) GDOT and GTA should continue to identify bench and shelter needs. These facilities help increase the comfort and convenience for pedestrians accessing transit.

## 5.4 NCDOT's Division of Bicycle and Pedestrian Transportation (DBPT)

Bicycle and pedestrian facilities have gained widespread acceptance in North Carolina as legitimate modes of transportation. NCDOT's Division of Bicycle and Pedestrian Transportation (DBPT) partners with local governments to identify bike/pedestrian needs, provides technical assistance, advocates for bicycle/pedestrian safety, and establishes policy guidance through various plans and reports.

The DBPT has made significant progress in promoting public interest and providing resources for bicycle/pedestrian facilities. DBPT, through NCDOT's Long Range Multimodal Transportation Plan (LRMTP), is now focusing on improving implementation of pedestrian and bicycle projects:

"Current policy for sidewalk improvement cost sharing places a substantial financial burden on local governments. In many cases, needed sidewalks or extra width necessary for bicycle lanes are not incorporated into a project due to a lack of local funding. Planning for these types of facilities is now being considered earlier in the NCDOT planning process." (NCDOT, LRMTP, p.17)

NCDOT's attempt to "mainstream" bicycle/pedestrian facilities is a step in the right direction that will require assistance from DBPT staff to update design manuals and planning procedures. The DBPT's website (<http://www.ncdot.org/transit/bicycle>) provides a guide—intended for use by educators, law enforcement officials, planners, and citizens—that serves as a valuable tool and reference document for education and enforcement of bicycle and pedestrian laws. GDOT staff should become familiar with and share the information in this guide with local agencies and community organizations.

## 5.5 Planning Projects

The City of Greensboro and surrounding communities should work with NCDOT to conduct several specific planning projects to help identify additional pedestrian and bicycle facility needs in the region. These planning projects can help achieve the following objectives:

- Prioritize intersections for pedestrian countdown signals throughout the Greensboro MPO area.
- Identify additional pedestrian crossing improvements near transit stops and stations.
- Identify bus stop access improvements, including shelters, benches, bicycle racks, and bicycle lockers.





- Recommend new locations for bicycle racks and lockers (e.g., parks, community centers, shopping centers, transit hubs, government buildings, etc.)
- Develop a pedestrian, bicycle, and transit wayfinding sign plan.